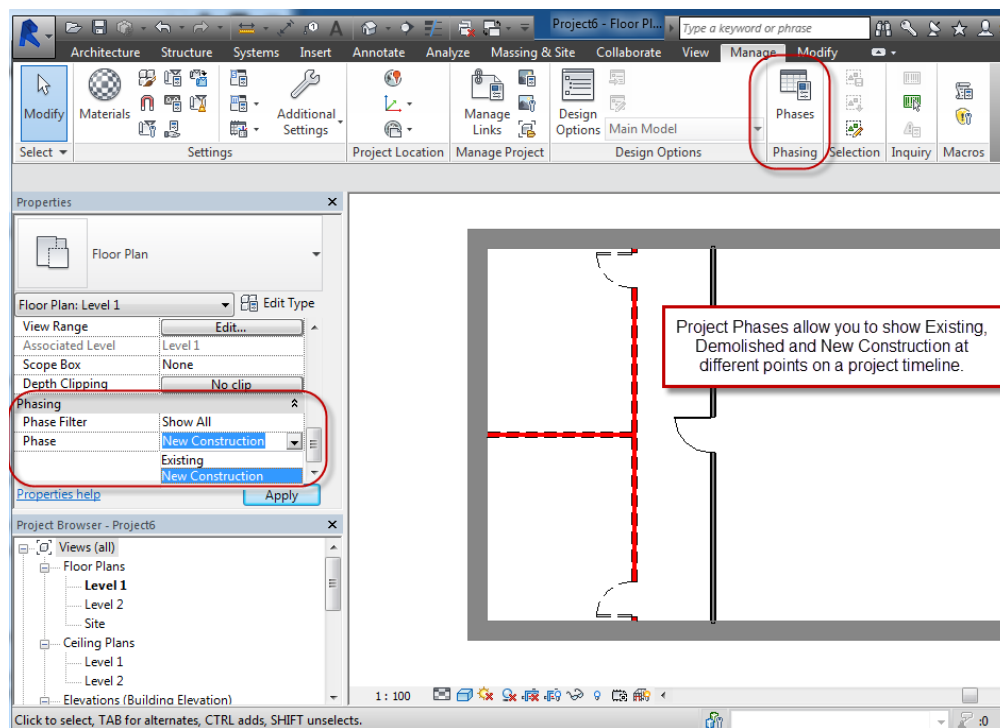


AGENDA:

1. Project Phasing
2. Phase Filters and Graphic Overrides
3. Infill Elements and Demolishing Elements

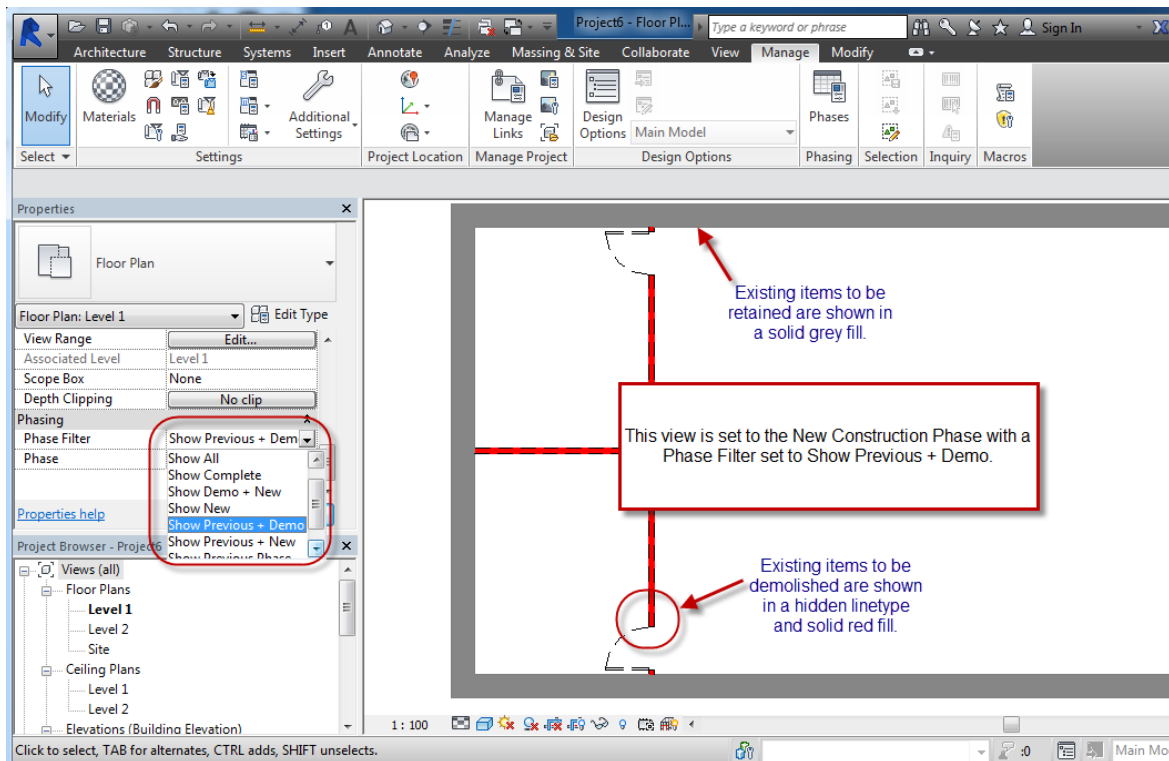
1. Project Phasing

Project Phasing allows you to work with the timeline of a project and consider what portions of a building model exist at certain point in time. Then in any particular view, You can set building elements to be hidden, displayed, or displayed with a graphic override such as a hidden linetype, or transparent material relative to the point in time being depicted for that view.



Many projects work with existing building elements, some of which will remain, some which will be demolished. Demolition of existing elements and the addition of new features will proceed in 4, very distinct periods on the timeline: *Existing Construction, Demolition, New Construction, and Complete*

Phasing uses a combination of Phases, such as Existing and New Construction, and Phase filters such as Show New and Show Previous, assigned to different views. To start, there are a minimum of two available Phases in any Project – Existing and New Construction. By default the Phase is set to New Construction. It is possible to add any number of additional Phases if required. For example, a large project might actually be built in additional phases where a main building is constructed during a Phase I in the project timeline and then secondary buildings are added the following year during a Phase II.

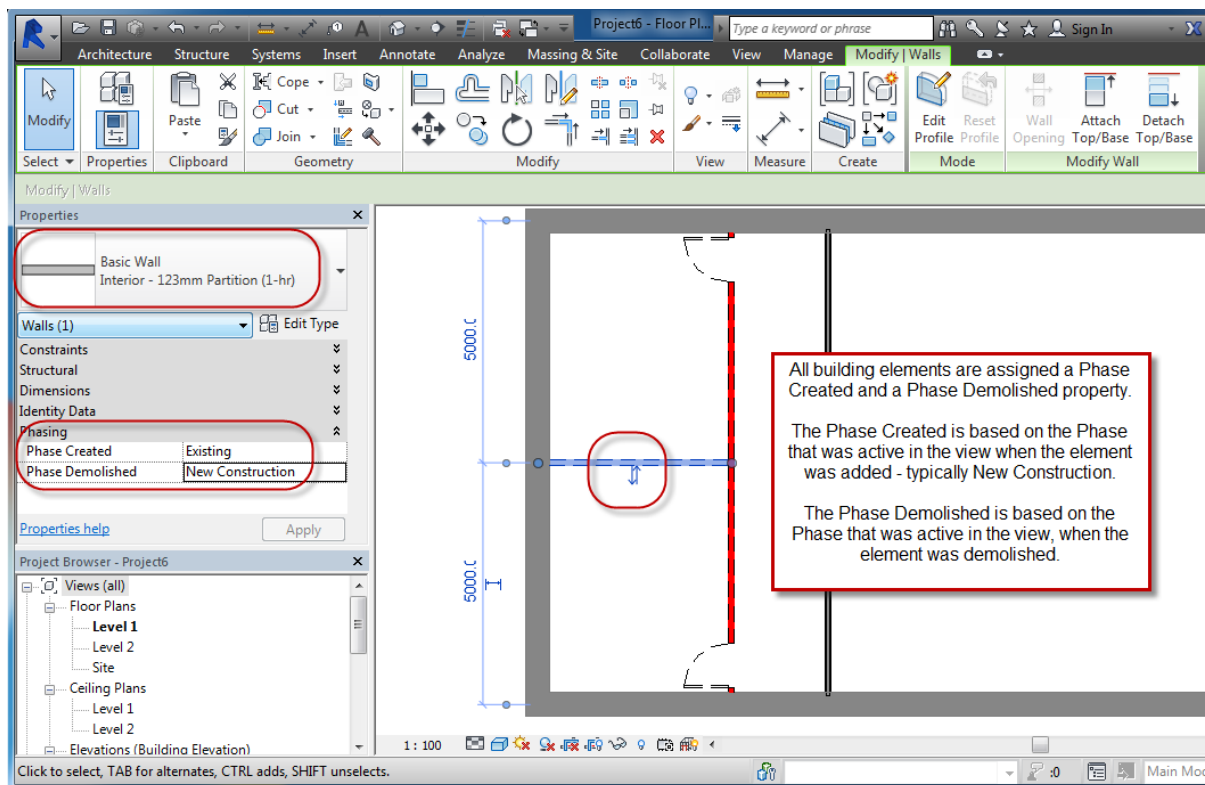


Phase filters are rules which can be assigned to a view to show the conditions at different points in a timeline. First you set the Phase you want to see – Existing or New Construction. Then you set the desired Phase filter to control which elements are displayed. You can Show All elements, or just Show the New Construction, or you can Show the Previous Phase + objects which will be demolished. In the example above, the solid grey, exterior walls were created in the Previous phase (Existing) but will be retained in the finished project. The interior walls, highlighted in red and a hidden line, indicate that they were also created in the Previous Phase but instead of being retained, these walls are being demolished and removed during the New Construction phase.

LECTURE NOTES: CLASS 11

In order for Phases and Phase filters to work when assigned to Views, you must also use Phase property parameters assigned to all of the elements in the building. Phase Properties are assigned to building elements to identify where they exist on the project timeline.

The Phasing parameters assigned to building elements are Phase Created and Phase Demolished. By default, when you draw new entities such as walls, they are assigned a Phase Created property based on the current Phase: Existing or New Construction. The Phase demolished property is set to none.

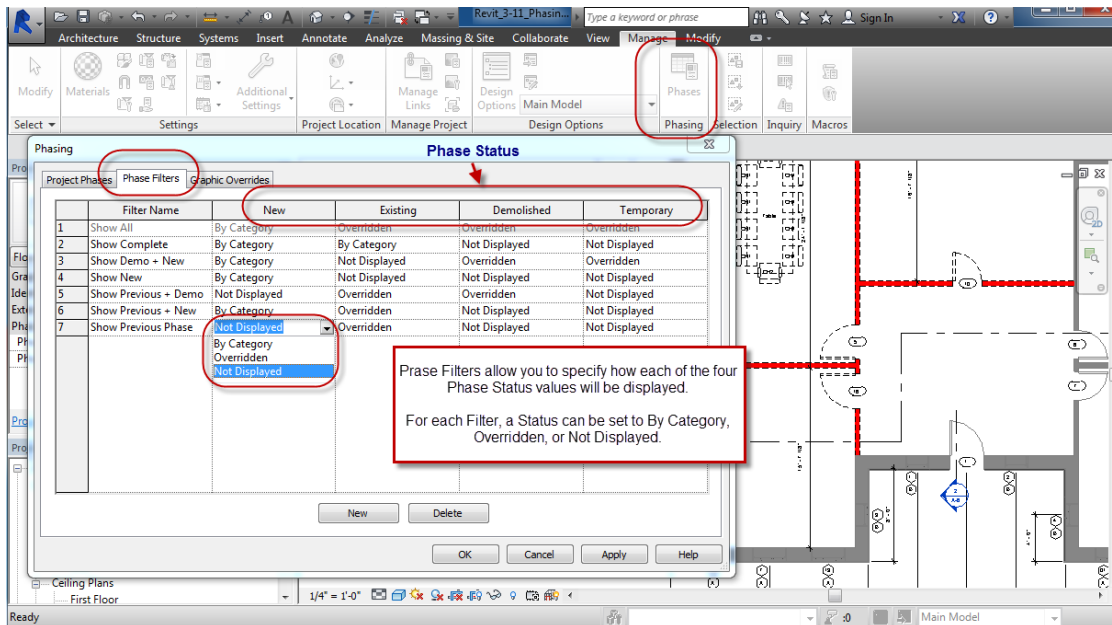


A building element can have its Phase Demolished property assigned by selecting the element and then setting the Phase Demolished parameter in the Properties palette, or by using the Demolish tool on the Geometry Panel.

The Phase demolished can come after the Phase Created but not before. If Phase Created and Phase Demolished use the same Phase, either Existing or New Construction, the element is considered to be Temporary Construction.

2. Phase Filters and Graphic Overrides

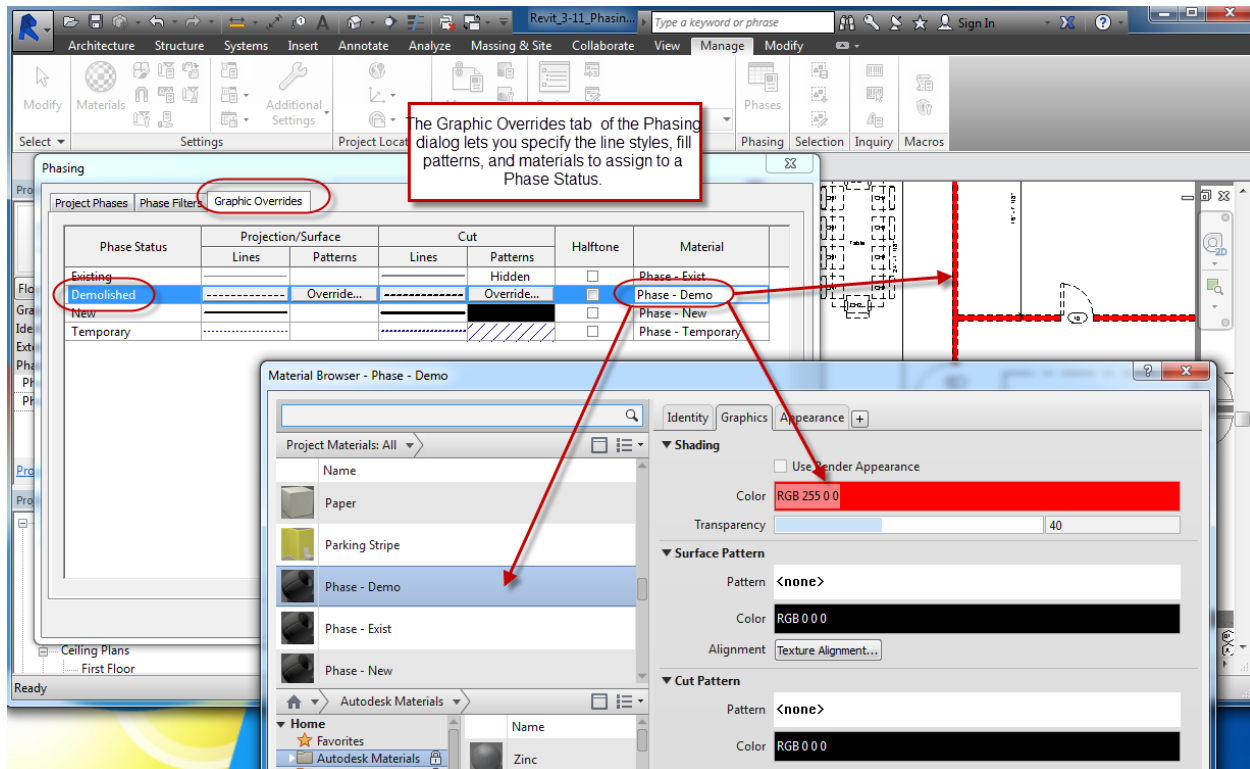
There are 8 possible Phase Filters which can be applied to the current view. The default is None, which in effect, disables the Phasing feature. The others are: Show All, Show Complete, Show Demo + New, Show New, Show Previous + Demo, Show Previous + New, and Show Previous Phase.



When you combine the Phase of the current view, with the Phase Created/Phase Demolished properties of the Building Element you will have one of four Phase Status values: New, Existing, Demolished, or Temporary. If an element was created in the phase of the current view it is New. If it was created in a previous phase, then it is Existing. If an element was created in an earlier phase, and demolished in the current phase, it is Demolished. If an element was created in the current phase and also demolished in the current phase, then it is Temporary.

The Phase Filters allow you to specify how building elements will be displayed in a particular view for each of the four status choices. A status can be set to By Category, meaning it will display normally. Or it can be Not Displayed. Or it can be set to Overridden. When a status is set to Overridden for a particular Filter, then it will take one the graphic overrides which are defined for that status in the Graphic Override tabs.

Graphic Overrides are defined for each of the four Phase Status values. This is where you can specify the line styles, and fill patterns assigned to an object in a cut state or projection state, when its status is Existing, New, Demolished, or Temporary.



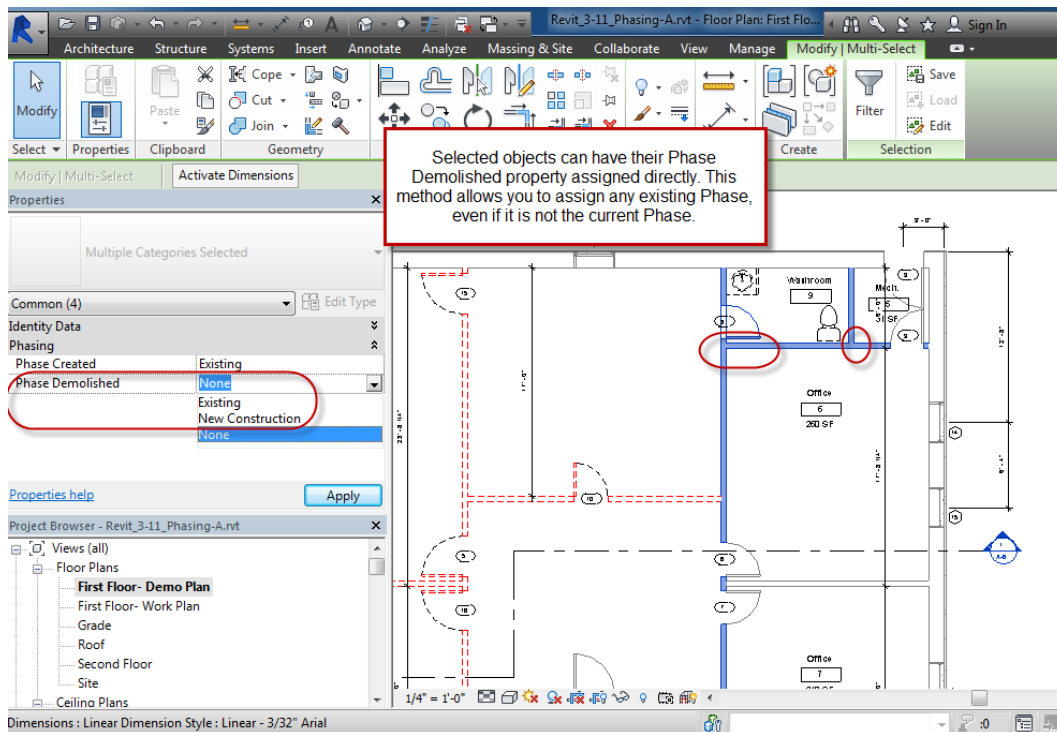
The halftone option is especially helpful to distinguish between existing and new construction in a plan view, allowing you to show the current phases in a solid color and ink level while the previous phases elements are shown in a semi-transparent, screened ink level.

There are also four Phase Materials corresponding to the four Phase Status settings. These are Phase-Demo, Phase-Exist, Phase-New, and Phase-Temporary. The Phase materials are useful for setting colors and transparency levels for shaded 3D views.

The Projection/Surface settings for patterns will override the surface pattern setting defined in the Phase materials. The Materials only control the shading colors and transparency levels. To hide the display of surface patterns in elevations, use the Patterns settings in the Graphic overrides.

3. Demolishing Elements and Infill Elements

Demolished elements may be defined in two ways. You can select any existing element or set of elements and then assign a Phase for the Phase Demolished Property.

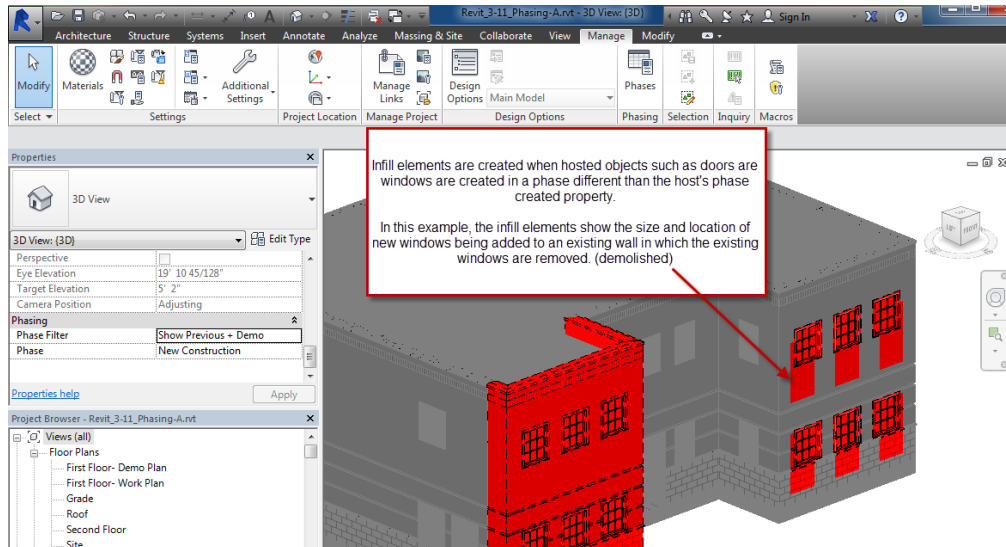


The Demolish tool found on the Geometry panel of the Modify tab lets you pick elements and assign their Phase Demolished property to match the current Phase of the view.

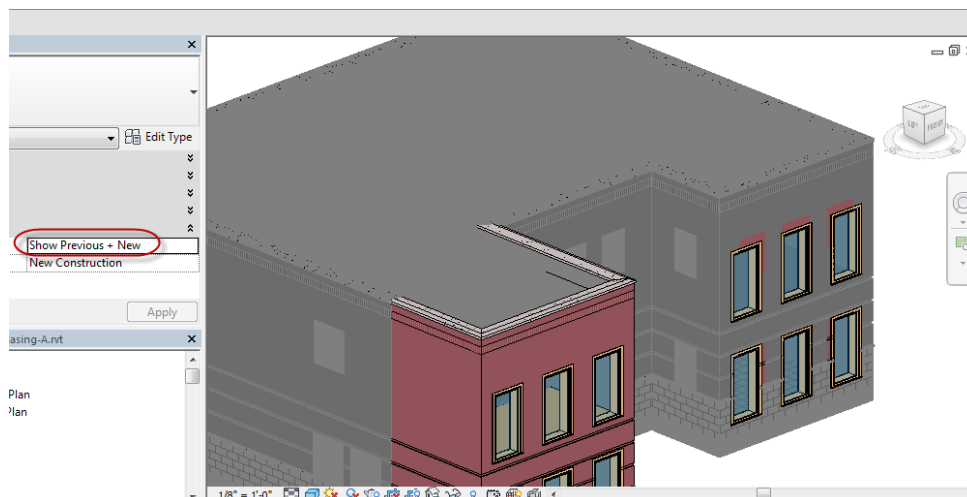
After a building element is defined as demolished in a specific phase in one view, it will automatically be defined as demolished in all other views which are set to the same Phase.

When you demolish a host element such as a wall, all of the host's inserts such as doors and windows are also set to demolished. You can demolish an insert though, without affecting the Phase Demolished property of the insert's host. You can demolish a window from a wall and still keep the wall but you can't demolish a wall with windows and expect to keep the windows floating in place while you build a new wall around them. 😊

Infill elements are used to fill gaps or holes which are created when hosted elements such as doors and windows are demolished and then new elements are added in the same, existing wall.



If the replacement objects (windows) are the exact same size as the demolished objects, infill elements would not be shown. In the example above, the Phase is set to New Construction but the Phase Filter is set to Show Previous + Demo. The additional red outline below the windows being removed shows the size and location of the replacement windows that will be created in the New Construction Phase.



This second image shows the same building with the Phase Filter set to show Previous+ New.

Exercise Notes

In the following exercise you are going to experiment with working with Phases and Phase Filters.

1. Open the Office project that we worked on in a previous class. Save the file with a new name by adding "Phase-2" to the existing file name. For example, Office_Phase-2.rvt
2. Switch to the First Floor Plan view and take a look at the Phase properties for the view. The Phase is set to New Construction and the Phase Filter is set to Show All. If you switch to any of the existing views to check, all of them will be set to these values.
3. Select any building element and check its Phasing properties to confirm that the Phase Created is set to New Construction and the Phase Demolished is set to None.
4. Clear your selection and try changing the Phase for the view to Existing. Everything will be hidden as the Existing Phase was prior to the New Construction Phase and there were no objects defined as being created in the "existing" phase.
5. Set the Phase back to New Construction and try setting the Phase Filter to Show Previous Phase. This time only the room tags and section markers will be shown. Set the Phase Filter back to Show All.
6. Our goal is to transfer all building elements to the first phase on the timeline; typically called "Existing" and then do all new work, including demolition and the addition of new elements on a second Phase, typically called "New Construction". There are two methods we can use to set up Phases to reflect a new stage of construction and renovations for this project.

Method One:

- a. On the Manage tab, open the Phases dialog and pick the number 2 to highlight the second line. Pick the After button under Insert and create a new Phase called "Phase 2"
- b. Highlight the second line again and then pick Combine with Previous to merge the "New Construction" phase with the "Existing" Phase. Pick Apply and Ok to close the dialog.
- c. This method will automatically change the Phase Created property for all building elements from "New Construction" to "Existing". It will also change the Phase assigned to all views from New Construction to Existing.

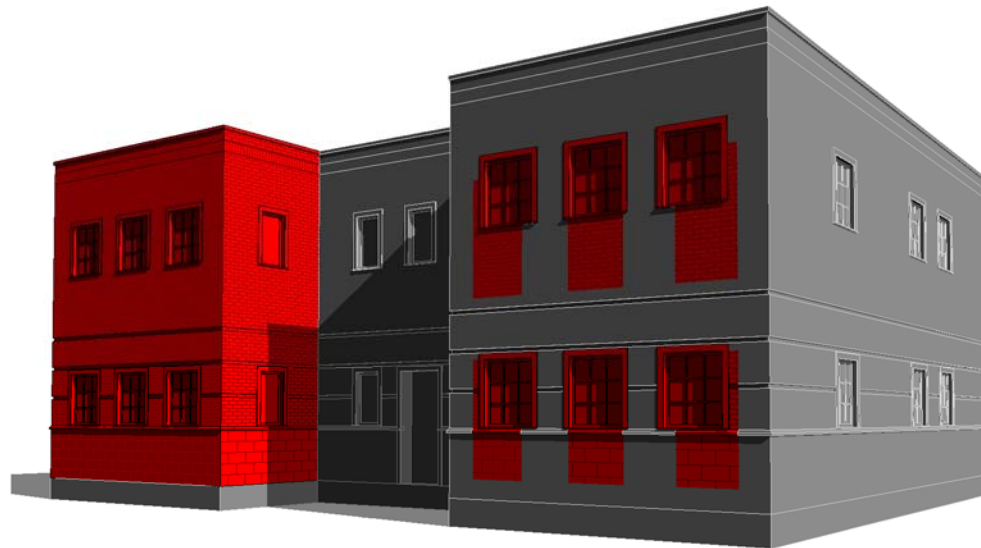
7. Check the Phase for the current view to confirm it has changed to Existing. Select any wall and check its Phase Created property to confirm it has also changed to Existing. Change the Phase Filter to Show Previous Phase and all objects will disappear.
8. Change the current Phase for the view to Phase 2. The building should change to grey, indicating that it was created in a Previous Phase. Change the Phase Filter to Show Complete and the plan will appear normal again. It is the beginning of Phase 2, and the existing building has not yet been modified. The next step will be to demolish any walls or other building elements such as doors or windows and then start adding our new walls. But let's look at the other method we can use to enable Phasing for a renovation project. Undo all of the previous steps to restore the original phasing setup.

Method Two:

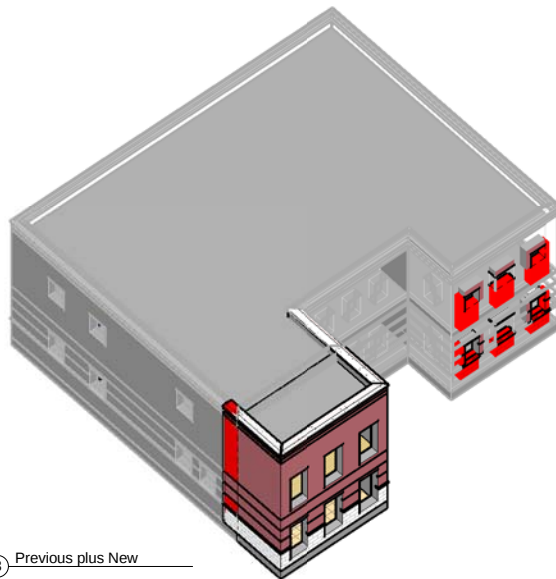
- a. Switch to the default 3D view and check the Phasing Properties. The Phase should be New Construction and the Phase Filter should be Show All. Change the Phase Filter to Show New.
 - b. Select the entire building with a large, windowed selection and check for a Phasing selection in the Properties Palette. Change the Phase Created property to Existing.
 - c. If the previous step did not display a Phasing property, you may need to use filters or the SA selection method to change the Phase Created status in a series of steps. Walls, then doors, floors, etc. As you change the Phase Created property, the building elements will disappear as they do not pass the Phase Filter criteria – Show New.
9. Change the Phase to Existing and the building will reappear. Change the Phase back to New Construction. Change the Phase Filter to Show Previous. The entire building will display in grey. Change the Phase Filter to Show Complete. Change the Filter to Show All.
 10. The main difference between Method One and Method Two is the current Phase assigned to all existing views. With the first method, the current Phase for all views in the project changed from New Construction to Existing. With Method #2, only the Phase Created property for the building elements was modified. All of the views in the project are still set to New Construction. Choose whichever method sets the current view phase to the one you prefer to start with.

11. Continuing with Method 2, we will start to define the elements for demolition and rough in some new elements. From the Modify tab, Geometry Panel, pick the hammer shaped “Demolish” tool and pick the six windows on the SE Bay of the building.
12. Change the Phase Filter to Show Complete. Change it to Show Previous + Demo. This shows more detail in the demolished elements. Zoom in and compare the appearance of the demolished windows with the windows on the other bay of the building. Existing portions of the building that are not in the scope of the renovation show much lower detail than the portions we schedule for demolition.
13. Select the front wall of the left bay and in the properties palette, set the Phase Demolished property to New Construction. The wall and its six windows will all change together.
14. Change the Phase Filter back to Show All. Select the same wall you set to demolish and copy it 8 feet to the south. The plan is to extend the building by 8 feet on this side, using the same wall construction as the existing building. The copied wall, because it was created with the current view Phase set to New Construction, has a Phase Created status of New Construction as well.
15. We are going to change all of the windows on both bays to new windows. Use the Demolish tool and pick the top three windows on the copied wall. The windows show a blue outline, indicating that they are temporary elements which were created and then demolished during the same phase of construction. The current view now shows elements in each of the four phase statuses – Existing, New, Demolished, and Temporary.
16. There will not really be any temporary windows installed and removed so select all six windows in the copied wall and delete them. Switch to the first floor plan view.
17. Set the Phase Filter to Show Complete and the demolished elements will be hidden from view.
18. Delete any furniture you have in the plan. We’ll put it in storage while we renovate. 😊
19. Use the Demolish tool and pick the main North/South interior wall. If you get warnings about rooms, choose to delete the rooms to continue. Demolish the two horizontal walls that intersected the wall you just deleted.
20. Create two new walls to close the new building outline. Do not extend the existing walls or they will use the same Phase Created status as the wall being extended. Use the Modify / Wall Joins to adjust the butt joint between the new and existing walls.

21. Pick the edge of the existing floor and use Create Similar to start a new floor. Use Pick walls, Pick Edges, and trim to corner to define the floor boundary and finish the floor.
22. Set the Phase Filter to Show Previous + New and zoom in around the right bay. Add three new windows to replace the six that were demolished on the first floor. Use a 36" x 72" Fixed Window and align the first window on top of the infill in the middle of the wall. Copy the window 4'-6" to either side so the copies partially overlap the demolished windows.
23. Change the Phase Filter back to Show Complete so you can see the new windows. Select all three and copy them to the front wall of the newly extended left bay.
24. Switch to the 3D View. Set the Phase Filter to Show Complete. Copy the six windows on the first floor to Clipboard. Use Paste Aligned to selected levels to add six windows on the second floor. (If necessary, switch to the first floor plan to copy and then then second floor plan to paste aligned if the paste aligned is not available in the 3d view) Change the window types on the second floor to 36"x48" with a 3 foot sill height.
25. Switch to the Second Floor, set the Phase Filter to Show Complete, and use Create Similar to add a section of floor in the new area of the West Bay.
26. Switch to the Roof Plan, set the Phase Filter to Show Complete, and use Create Similar to add a section of roof in the new area of the West Bay. Adjust view range if necessary to see the existing roof edge. (set view depth to Level Below - second floor and set cut plane to 1'-0")
27. Switch to the 3D view and toggle the Phase Filter through all options to see how you can get the building to display different combinations of elements. Set the Phase Filter to Show Previous + New and zoom in to an area showing the junction between New walls and Existing walls. Let's hide the surface pattern of brick for the existing walls. From the Manage tab, choose Phases and then go to the Graphic Overrides tab. In the Existing row, below Projection/Surface Patterns, pick the Override button and clear the check mark by Visible. Pick OK. Enable the Halftone option for the Existing row as well. Pick Apply and Ok.
28. Switch to the South elevation and experiment with the Phase Filters before setting the Filter to Show Complete. Switch to the other three elevations and repeat the process. Adjust the elevation labels as required in 2D to pull the labels off the building in the East and West views.
29. Switch the First Floor view and set the Phase Filter to Show Complete. Duplicate the view and name the new view First-Floor-Demolition. Set the Phase Filter to Show Previous + Demo.
30. Save and close the file. We will continue with Design Options in the next class.



① Previous plus Demo



③ Previous plus New



② SW Perspective

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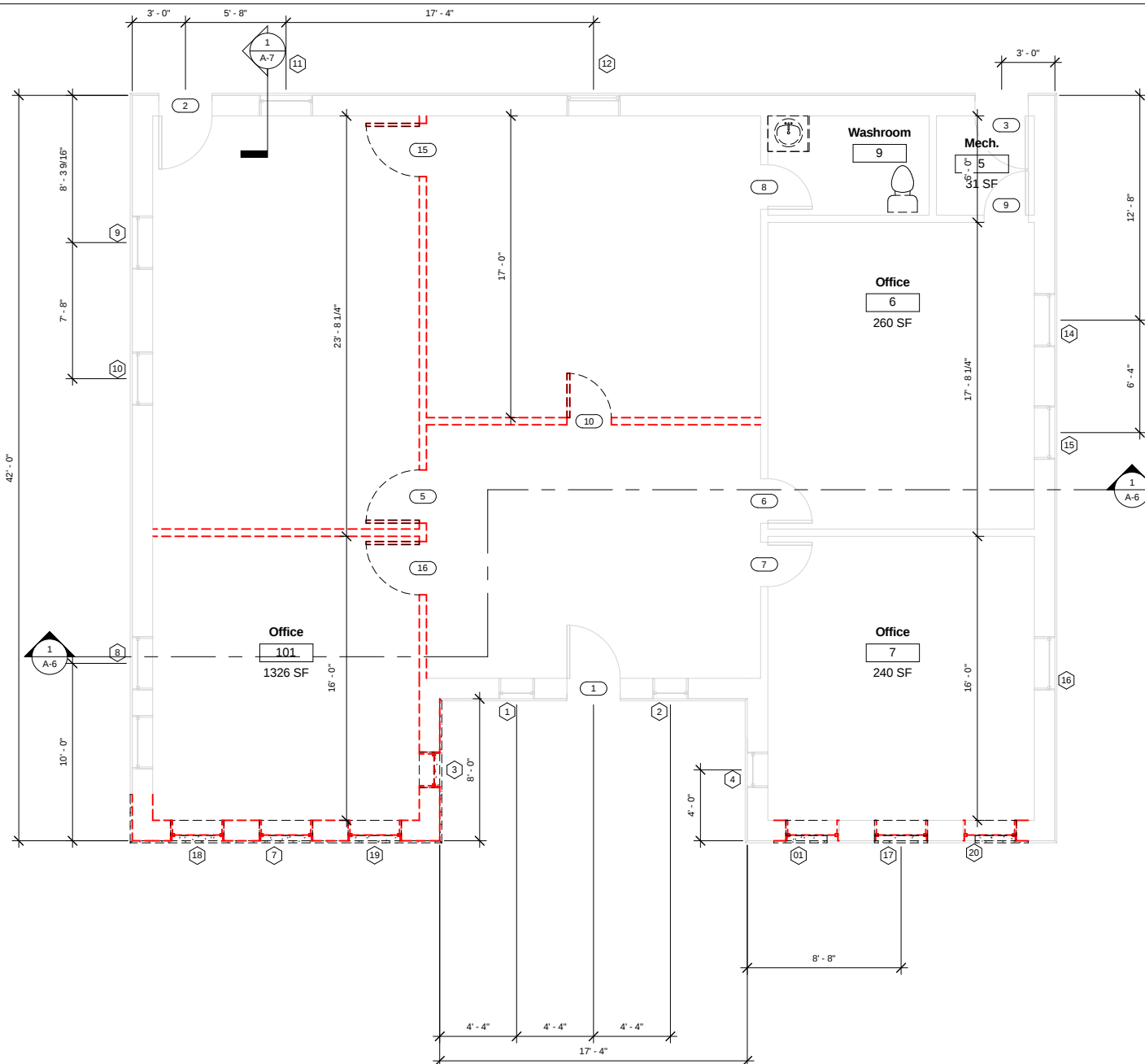
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Perspectives

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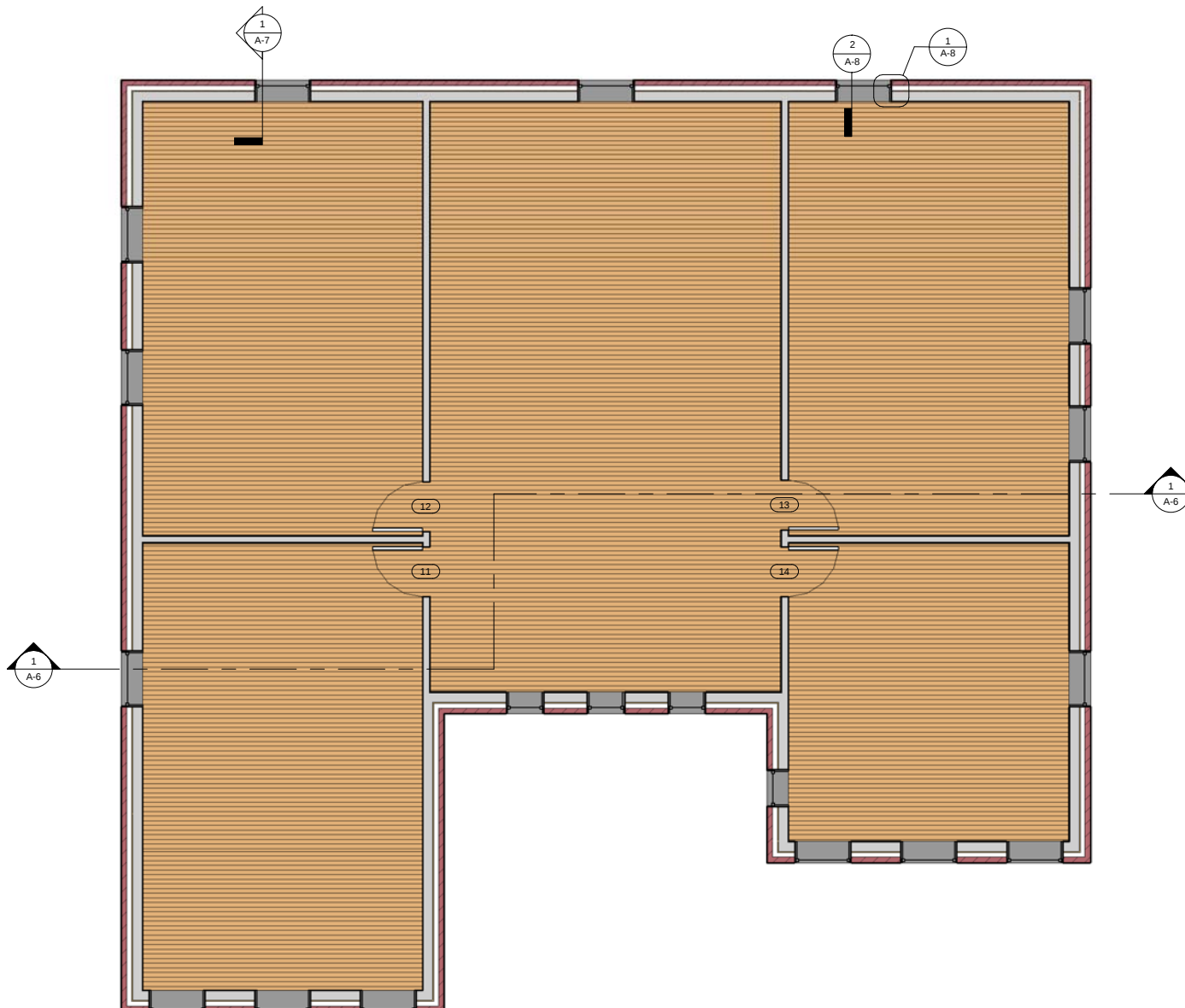
Green Inc.
Meadow Centre
Second Floor Plan

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① Second Floor Plan
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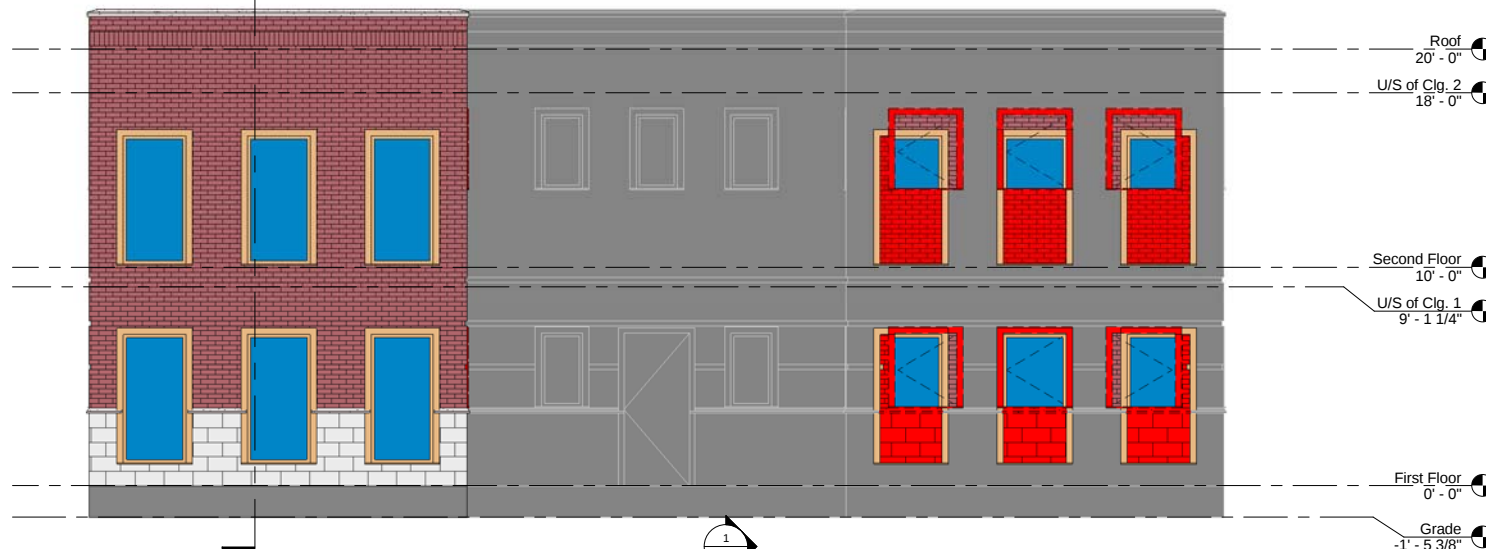
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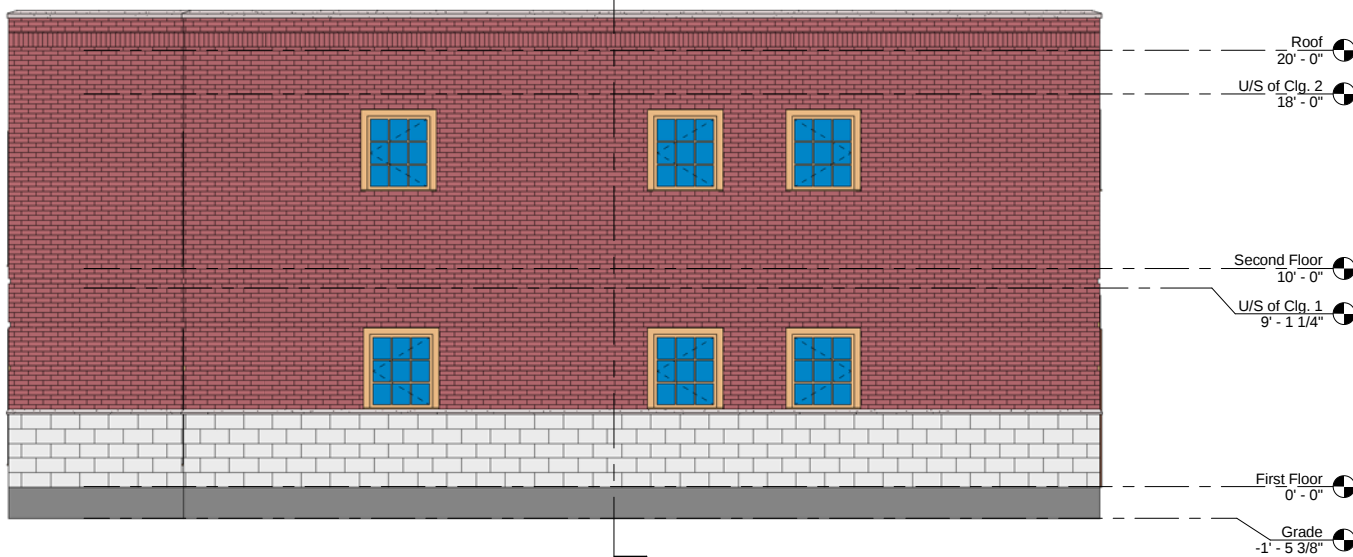
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① South Elevation
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② East Elevation
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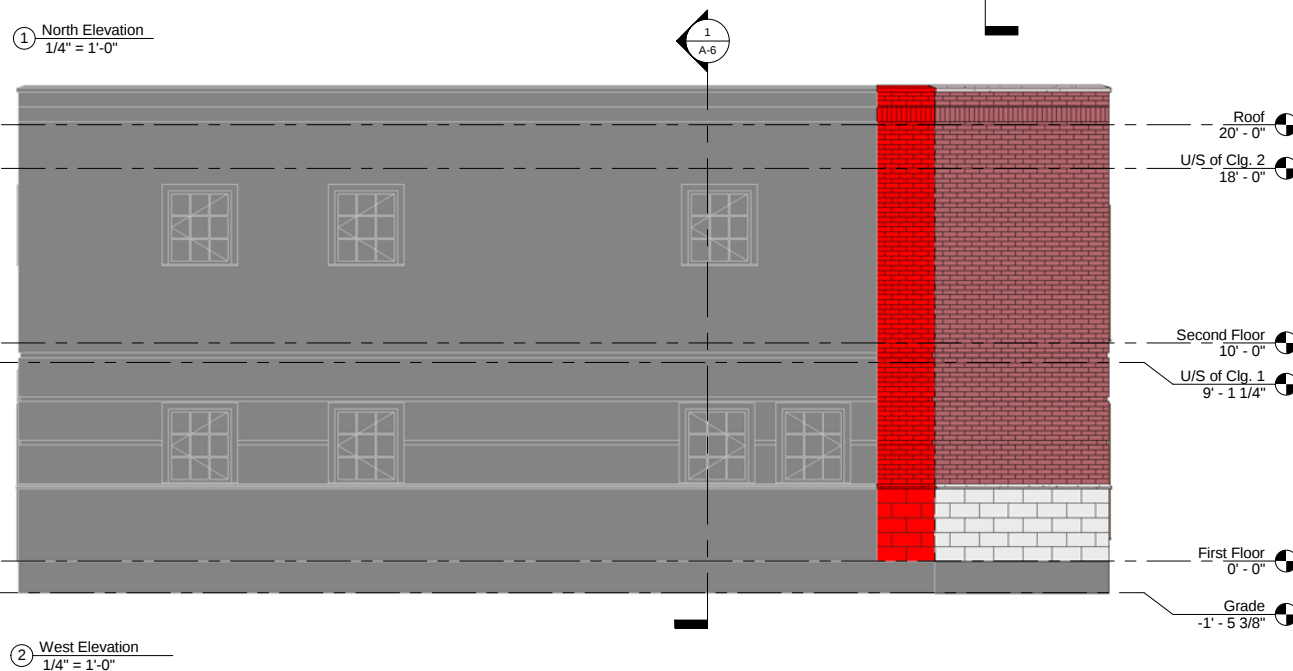
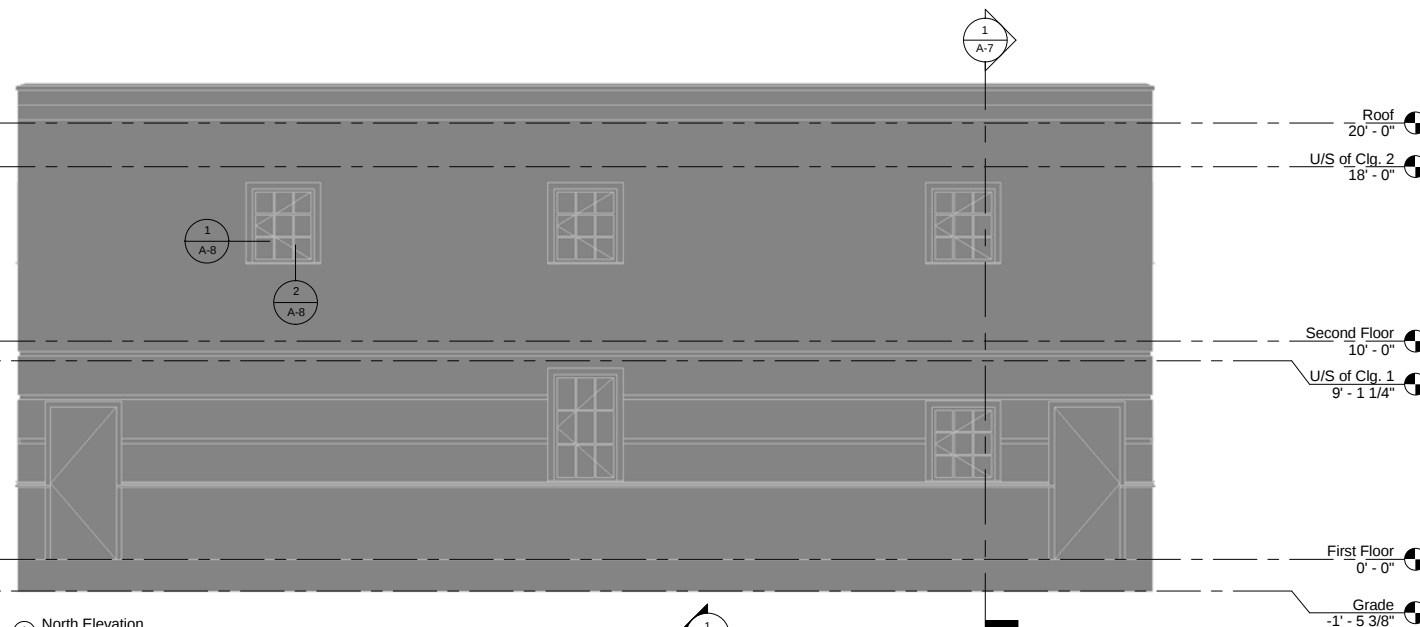
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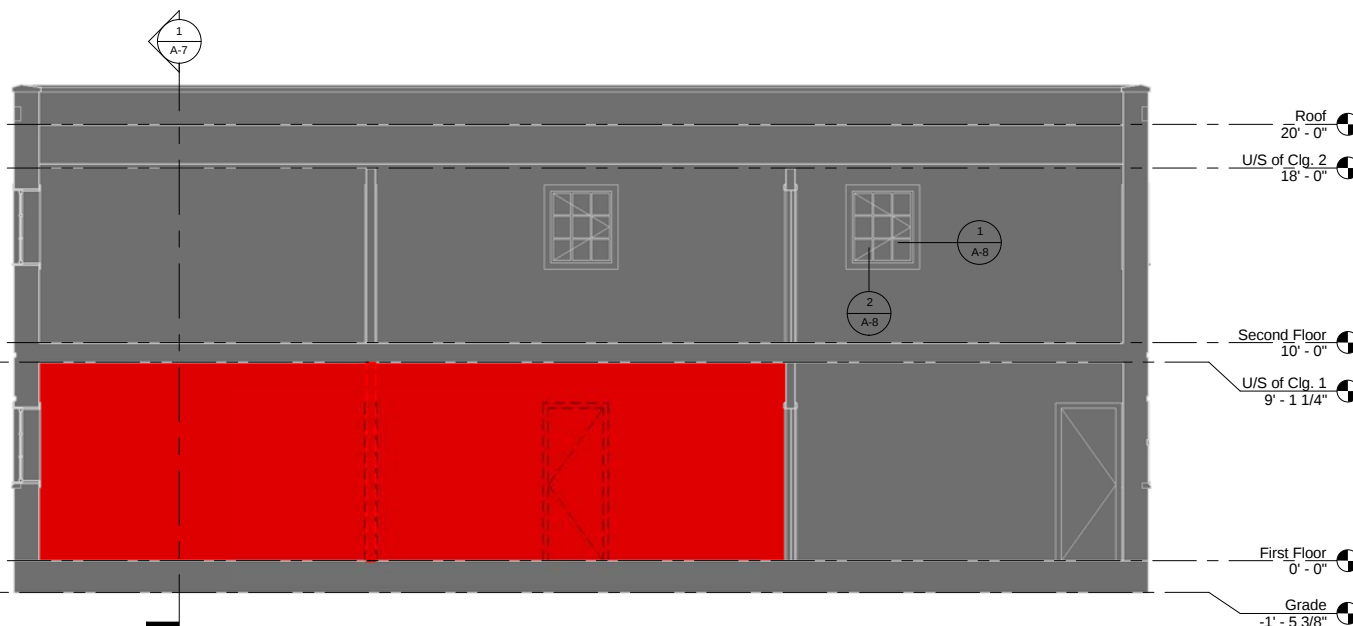
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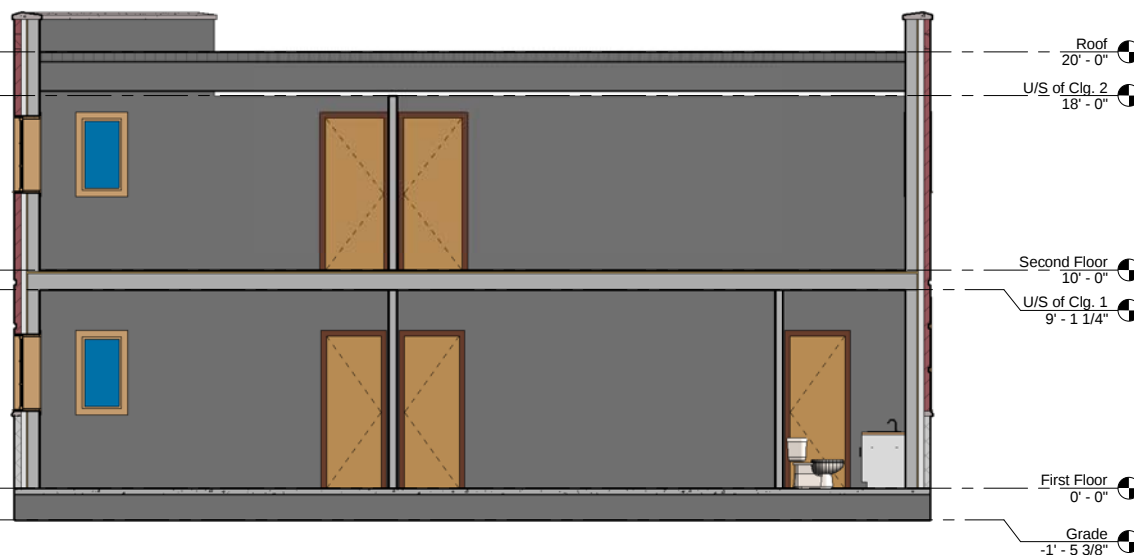
Green Inc.
Meadow Centre
Building Sections

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① Longitudinal Section
1/4" = 1'-0"



② Cross Section
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